

REMARKS

By this response, Claims 1-4, 6, 8, 10, 11, 14, 18, 22, 23 and 25 have been amended; and new Claims 26-30 have been added, leaving Claims 1-30 pending in the application. The specification has been amended to incorporate subject matter recited in original Claims 10 and 12. No new matter has been added by the amendments.

Reconsideration and allowance are respectfully requested in view of the following remarks.

Restriction Requirement

Applicants affirm the election, with traverse, of Group I, Claims 1-21. It is noted that Claims 22-25 stand withdrawn from consideration as being drawn to non-elected subject matter.

Claim 22, which recites a method, have been amended to recite all of the features of Claim 1, which is directed to an apparatus (i.e., a product). According to MPEP § 821.04, "if applicant elects claims directed to the product, and a product claim is subsequently found allowable, withdrawn process claims which ... include all the limitations of the allowable product claim will be rejoined" (emphasis added).

Consistent with this procedure, once Claim 1 is found allowable, withdrawn Claim 22 (and Claims 23-35 dependent therefrom) should be rejoined with the elected subject matter.

Objections to Drawings

The Official Action objects to the drawings under 37 C.F.R. § 1.83(a) for the reasons stated at numbered point (2) on pages 2-3 of the Official Action. The Official Action states that the following recited features must be shown in the drawings: "first member," "second member," "first part," "second part," "first surface" and "second surface." However, Applicants respectfully submit that the original drawings do, in fact, show these features.

Claim 1 recites "a first member bonded to a second member." Dependent Claims 7 and 8 recite the respective features of "the first member comprises a plate made of graphite, and the second member comprises a showerhead electrode made of silicon" and "the second member comprises an inner silicon electrode and a segmented outer silicon electrode, and the first member comprises a graphite backing plate secured to the inner silicon electrode and a graphite backing ring secured to the outer silicon electrode." FIG. 3 shows an embodiment of the claimed component including an outer electrode member 14 secured to a backing ring 22. FIG. 5 shows a backing plate 18 with a fastener member 38 mounted in an aperture of the backing plate 18. In the view of FIG. 5, the inner electrode member 12 and outer electrode member 14 shown in FIG. 1 (which are secured to the backing plate 18 and backing ring 22, respectively) are removed to show the bottom surfaces of the backing plate 18 and backing ring 22. Accordingly, exemplary embodiments of the claimed "first member" and "second member" are shown in the drawings.

Claim 10 recites, *inter alia*, the features of "a first part including an attachment surface and an exposed surface adapted to be exposed to an interior of a plasma processing chamber; a second part including a first surface spaced from a second

surface, the first surface being bonded to the attachment surface of the first part.”

Claim 12 depends from Claim 10 and recites the features of “the first part is a showerhead electrode, and the second part is a backing plate.” As discussed above, exemplary embodiments of the showerhead electrode and backing plate are shown in the original drawings. In the embodiment shown in FIG. 1, the inner electrode member 12 and outer electrode member 14 have a bottom surface exposed to an interior of a plasma processing chamber, and a top surface (“attachment surface”) bonded to a bottom surface (“first surface”) of the backing plate 18 and backing ring 22, respectively. The backing plate 18 and backing ring 22 also have a top surface (“second surface”) spaced from the bottom surface.

For at least the foregoing reasons, Applicants submit that the original drawings sufficiently show the recited “first member,” “second member,” “first part,” “second part,” “first surface” and “second surface,” and thus the drawings are in compliance with the requirements of 37 C.F.R. § 1.83(a). Therefore, withdrawal of the objections to the drawings is respectfully requested.

Obviousness-Type Double Patenting Rejection

Claims 1-21 stand rejected under the doctrine of obviousness-type double patenting over Claims 1-25 of co-pending U.S. Application No. 10/445,146 for the reasons stated at numbered point (4) on page 3 of the Official Action.

While not acquiescing in the rationale for the rejection stated in the Official Action, to expedite prosecution, Applicants have attached an executed Terminal Disclaimer with respect to the ‘146 application, which obviates the rejection. Therefore, withdrawal of the rejection is respectfully requested.

Rejection Under 35 U.S.C. §112, First Paragraph

Claims 10-16 stand rejected under 35 U.S.C. § 112, first paragraph, for the reasons stated at numbered point (6) on page 4 of the Official Action.

The Official Action states that Claim 10 recites the features of a “first part,” “second part,” “first surface” and “second surface,” but that these features are not described in the specification.

The original claims constitute their own written description. See In re Koller, 204 USPQ 702 (CCPA 1980) and MPEP § 2163(I), paragraph bridging pages 2100-164 to 2100-165. As such, the original disclosure, including the claims, provides a written description of the claimed subject matter.

In order to provide a written description of the subject matter recited in Claim 10 also in the specification, Applicants have amended the specification to describe the subject matter recited in Claim 10 (and also the subject matter recited in Claim 12): As stated at MPEP § 2163(I)(B), page 2167:

[t]he claims as filed in the original specification are part of the disclosure and, therefore, if an application as originally filed contains a claim disclosing material not found in the remainder of the specification, the applicant may amend the specification to include the claimed subject matter.

Accordingly, the amendment to the specification to incorporate subject matter from the original claims does not introduce new matter.

Withdrawal of the rejection is respectfully requested.

Rejection Under 35 U.S.C. §112, Second Paragraph

Claims 1-16 stand rejected under 35 U.S.C. § 112, second paragraph, for the reasons stated at numbered point (8) on page 4 of the Official Action.

Claim 1, as amended, recites the features of "a first member bonded to a second member, the first member including a plurality of through apertures having a first portion and a second portion wider than the first portion." The Official Action questions whether the "first portion" or the "plurality of through apertures" has "a first portion and a second portion wider than the first portion," as claimed. In the component recited in Claim 1, the apertures have "a first portion and a second portion wider than the first portion." See, for example, the description at paragraph [0029] of the specification.

Thus, Applicants submit that the claims are in compliance with the requirements of 35 U.S.C. § 112, second paragraph, and therefore withdrawal of the rejection is respectfully requested.

Rejection Under 35 U.S.C. § 102

Claims 1, 2, 4, 6 and 9 stand rejected under 35 U.S.C. § 102(e) over U.S. Patent No. 6,818,096 to Barnes et.al. ("Barnes") for the reasons stated at numbered point (10) on pages 5-7 of the Official Action. The rejection is respectfully traversed.

Claim 1, as amended, recites a component of a plasma processing apparatus, which comprises "a first member bonded to a second member, the first member including a plurality of through apertures having a first portion and a second portion wider than the first portion; and a plurality of first fastener members each mounted in an aperture of the first member, each first fastener member including a head configured to prevent rotation of the first fastener members relative to the first member, the head having a bearing surface facing a surface that at least partially

defines the second portion of the aperture” (emphasis added). Support for the amendment to Claim 1 is provided in original Claim 6.

Referring to FIG. 3, for example, an exemplary embodiment of the component includes a fastener member 38 mounted in an aperture of a backing ring 22 bonded to an outer electrode member 14. A top plate 24 is adjacent the backing ring 22. A fastener member 28 is adapted to engage the fastener member 38.

The fastener member 38 has a head configured to prevent rotation of the fastener member 38 relative to the backing ring 22. For example, the fastener member 38 can have a T-nut configuration as shown in FIG. 4. The head 40 of the T-nut-shaped fastener member 38 has a generally rectangular shape, which prevents rotation of the fastener member relative to the backing ring 22. The head of the fastener member 38 can alternatively have other non-circular shapes effective to prevent rotation of the fastener member relative to the backing ring 22. See the description at paragraph [0033] of the specification.

Barnes fails to disclose a component of a plasma processing apparatus that includes each and every feature recited in Claim 1. The Official Action states that Barnes discloses a component comprising a “first member” 7 (i.e., lid 7) bonded to a “second member” 1, 8 (i.e., upper plate 1 and outer ring 8) including a plurality of through apertures, “T-shaped hole for 22” (i.e., attachment bolt 22), and a plurality of “first fastener members (members between 7 and 22)” each mounted in an aperture. At page 6, point (iii), the Official Action states that each of the “first fastener members” includes a “head (top thickest portion of 22)” configured to prevent rotation of the first fastener members relative to the first member. Applicants respectfully disagree with these assertions.

FIG. 1 of Barnes is a cross-sectional view of the plasma reactor electrode structure. FIG. 1 does not show that the shape of the hole in which attachment bolt 22 is received is necessarily "T-shaped," as asserted in the Official Action. FIG. 1 also does not show the shape of the "head" of the attachment bolt 22, much less show that the head is configured to prevent rotation of the attachment bolt 22 relative to the lid 7. It is also noted that Barnes does not include any other figure that shows the shape of the hole or the "head" of the attachment bolt 22. Furthermore, Barnes provides no description regarding the shape of the hole or the "head" of the attachment bolt 22. As such, Barnes does not disclose the features of "a plurality of first fastener members each mounted in an aperture of the first member, each first fastener member including a head configured to prevent rotation of the first fastener members relative to the first member, the head having a bearing surface facing a surface that at least partially defines the second portion of the aperture" (emphasis added).

Barnes also does not disclose that the "first member" 7 is bonded to the "second member" 1, 8, as recited in Claim 1.

Thus, for at least the foregoing reasons, the component recited in Claim 1 is not anticipated by Barnes.

Dependent Claims 2, 4, 6 and 9 are also not anticipated by Barnes for at least the same reasons as those discussed with respect to Claim 1. Moreover, these dependent claims recite additional combinations of features that are not disclosed or suggested by Barnes. For example, Claim 2 recites the features of "the first fastener members are T-nuts with internal threads." The Official Action asserts that "the first fastener members (members between 7 and 22 ...) are T-nuts with internal threads."

To the extent that the Official Action has asserted that the white portions inside of the attachment bolts 22 shown in FIG. 1 are T-nuts, Barnes does not support this assertion.

Claim 4, as amended, recites “a temperature-controlled top plate adjacent the first portion of the apertures of the first member and including a plurality of through openings each aligned with a respective aperture in the first member; and a plurality of second fastener members each engaged with a respective first fastener member to secure the first member to the top plate” (emphasis added). As recited in Claim 1 from which Claim 4 depends, the second portions of the apertures are wider than the first portions. In the exemplary embodiment shown in FIG. 3, the top plate 24 is adjacent the narrow portion of the aperture 36.

At page 6, point (ii), the Official Action asserts that Barnes discloses a temperature-controlled “top plate” 7. Applicants note that the lid 7 includes cooling channels 20. However, as discussed above, the Official Action also asserts that Barnes’ lid 7 is a “first member,” as claimed. As such, the Official Action asserts that the lid 7 is both a “first member” and temperature-controlled “top plate.”

However, this interpretation of Barnes does not achieve the subject matter recited in Claim 4. That is, Claim 4 recites that the temperature-controlled top plate is adjacent the first member. In other words, the top plate is (i) a separate feature of the component than the first member, and (ii) adjacent the first member. To the extent that Barnes’ lid 7 has been asserted to be a “first member,” as claimed, then Barnes does not disclose the recited “top plate” adjacent the lid 7, or vice versa.

Claim 6 recites the features of “each of the first fastener members includes a non-circular shaped head” (emphasis added). Barnes does not disclose the shape

of the heads of the "first fastening members," much less disclose that the heads are non-circular shaped.

Therefore, withdrawal of the rejection of Claims 1, 2, 4, 6 and 9 is respectfully requested.

Rejection Under 35 U.S.C. § 103

Claims 3, 7, 8 and 17-21 stand rejected under 35 U.S.C. § 103(a) over Barnes in view of U.S. Patent No. 5,766,364 to Ishida et al. ("Ishida"). The reasons for the rejection are stated at numbered point (12) on pages 8-11 of the Official Action. The rejection is respectfully traversed.

Claims 3, 7 and 8 depend from Claim 1. The Official Action acknowledges that Barnes does not disclose or suggest the combinations of features recited in Claims 3, 7 and 8, but contends that Ishida cures the deficiencies of Barnes. Applicants respectfully disagree.

Applicants submit that Ishida fails to provide the necessary suggestion or motivation to modify Barnes to result in the component recited in Claim 1, including, *inter alia*, features of "a plurality of first fastener members each mounted in an aperture of the first member, each first fastener member including a head configured to prevent rotation of the first fastener members relative to the first member, the head having a bearing surface facing a surface that at least partially defines the second portion of the aperture" (emphasis added). Thus, the component recited in Claims 3, 7 and 8 is also patentable over the applied references for at least the same reasons as those for which Claim 1 is patentable.

Moreover, Claims 3, 7 and 8 recite additional combinations of features that further patentably distinguish the claimed component over the applied references. For example, Claim 3, as amended, recites that “the surface that at least partially defines the second portion of the aperture is a second bearing surface and the bearing surface of each of the first fastener members is bonded with an elastomer to the second bearing surface.” Support for the amendment to Claim 3 is provided, for example, at paragraph [0038] of the specification. The Official Action asserts that Ishida discloses “first fastener members” 109 (i.e., heat conductors 109) “bonded” with an “elastomer” 31a (i.e., O-ring 31a). However, Ishida does not disclose the features recited in Claim 3 and thus provides no suggestion or motivation to modify Barnes to result in the claimed component.

Independent Claim 17 recites a showerhead electrode assembly for a plasma processing apparatus, which comprises “a silicon electrode having gas injection openings; a graphite backing member secured to the silicon electrode, the backing member including a plurality of through apertures each having a first portion and a second portion wider than the first portion; a top plate including a plurality of through openings each of which is aligned with a respective aperture in the backing member; a plurality of first fastener members, each first fastener member being mounted in a respective aperture of the backing member, the first fastener member including a bearing surface facing a surface at least partially defining the second portion of the apertures; and a second fastener member engaged with each first fastener member to secure the backing member to the top plate” (emphasis added). The applied references fail to suggest the showerhead electrode assembly recited in Claim 17.

The claimed showerhead electrode assembly comprises a silicon electrode having gas injection openings. For example, the embodiment of the claimed assembly shown in FIG. 1 includes inner electrode member 12 including gas injection openings, i.e. a plurality of openings. The gas injection openings are adapted to inject process gas into a plasma processing chamber.

The Official Action asserts that Barnes discloses an “electrode” 7 (i.e., lid 7) and a “top plate” 7 (i.e., lid 7). In other words, the Official Action asserts that the same lid 7 is both a top plate and an electrode. Applicants submit, however, that this interpretation of Barnes still does not achieve the subject matter recited in Claim 17. Particularly, Claim 17 recites that the backing member is secured to (i) the silicon electrode and (ii) the top plate. In other words, the silicon electrode and top plate are separate features of the assembly. Thus, to the extent that Barnes’ lid 7 can be considered an “electrode,” Barnes’ apparatus does not also include a “top plate,” as claimed. Alternatively, to the extent that Barnes’ lid 7 can be considered a “top plate,” Barnes’ apparatus does not also include an “electrode,” much less the claimed silicon electrode.

Furthermore, Claim 17 recites the features of “a graphite backing member secured to the silicon electrode, the backing member including a plurality of through apertures each having a first portion and a second portion wider than the first portion”. To the extent that Barnes’ upper plate 1 can be considered a “backing member,” Barnes does not disclose that the upper plate 1 includes “a plurality of through apertures each having a first portion and a second portion wider than the first portion,” as recited in Claim 17.

Also, Barnes' lid 7 is clearly not a silicon electrode with gas injection openings adapted to inject process gas into a plasma processing chamber, as the term "silicon electrode" would be understood by one having ordinary skill in the art. The lid 7 (i) forms the top of the electrode structure, (ii) is composed of an electrically and thermally conductive material, e.g., aluminum (column 2, lines 23-24 and 41-43), and (iii) also includes cooling channels 20. Barnes provides no motivation to modify the fluid-cooled lid 7 to result in a silicon electrode including gas injection openings, as claimed.

For at least the foregoing reasons, Barnes does not suggest the showerhead electrode assembly recited in Claim 17. Ishida fails to cure the deficiencies of Barnes. The Office Action asserts that it would have been obvious to add Ishida's "first fastener members 109" (i.e., heat conductor 109) to Barnes' "second fastener members" 18 (i.e., bolts 18). Applicants disagree with this assertion.

Furthermore, Ishida fails to suggest modifying Barnes' lid 7 and upper plate 1 in a manner necessary to comprise, *inter alia*, "a silicon electrode having gas injection openings" and "a graphite backing member secured to the silicon electrode, the backing member including a plurality of through apertures each having a first portion and a second portion wider than the first portion" (emphasis added), as recited in Claim 17. Thus, the assembly recited in Claim 17 is patentable over the applied references.

Dependent Claims 18-21 are also patentable over the applied references for at least the same reasons as those discussed with respect to Claim 17.

Therefore, withdrawal of the rejection is respectfully requested.

Claims 10-16 Are Patentable

The Official Action asserts at page 4, point (6), that “[t]he Examiner cannot make an accurate art-based rejection without claims 10-16 being properly supported by Applicant’s specification.” For reasons discussed above, however, the subject matter recited in Claims 10-16 is supported by the original disclosure. Thus, it is improper for the Patent Office to not examine these claims in light of the prior art.

Furthermore, Claims 10-16 are patentable over the applied references. For example, Claim 10, as amended, recites “a first part including an attachment surface and an exposed surface adapted to be exposed to an interior of a plasma processing chamber; a second part including a first surface spaced from a second surface, the first surface being bonded to the attachment surface of the first part, the second part including axially extending apertures extending between the first surface and the second surface, each of the apertures including a first portion opening in the first surface and a second portion opening in the second surface, the first portion being wider in a transverse direction than the second portion” (emphasis added). Support for the amendments to Claim 10 is provided, for example, in FIG. 3 of the drawings.

The combination of Barnes and Ishida fails to suggest the component recited in Claim 10. Barnes’ structure does not include a second part including apertures having a first portion and a wider second portion opening at a first surface of the second part, where the first surface is bonded to an attachment surface of a first part, as recited in Claim 10. Ishida does not suggest modifying Barnes to result in the component recited in Claim 10.

Dependent Claims 11-16 are also patentable over the applied combination of references for at least the same reasons as those for Claim 10.

New Claims

New Claims 26 and 27 recite features that have been deleted in Claims 2 and 18, respectively. Claim 28 depends from Claim 11 and recites the features of "the third part is a temperature-controlled top plate." Claim 29 depends from Claim 11 and recites that "the top plate is adjacent the first portion of the apertures of the backing member and is temperature-controlled." Claim 30 depends from Claim 17 and recites that "the backing member comprises a first surface and a second surface opposite the first surface, the first surface is secured to the silicon electrode and the second surface is secured to the top plate." For example, the backing member 22 shown in FIG. 3 includes a first surface (bottom surface) secured to the outer electrode member 14 and a second surface (top surface) opposite the first surface and which is secured to the top plate 24. Claims 26-30 are also patentable.

Conclusion

For the foregoing reasons, allowance of the application is respectfully requested. If there are any questions concerning this response, the Examiner is respectfully requested to contact the undersigned at the number given below.

Respectfully submitted,

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